



AAA CENTER FOR DRIVING SAFETY & TECHNOLOGY



2018 AUDI A6 PREMIUM



INFOTAINMENT SYSTEM* DEMAND RATING

High Demand



The 2018 Audi A6 Premium MMI infotainment system* placed high demand** on drivers in the study. The text messaging system and navigation were especially challenging, placing high visual (eyes-off-road) and cognitive (mental) demands on drivers.

Standard and Optional Features in the 2018 Audi A6

	Premium	Sport	Premium Plus	Prestige
○ Optional				
● Standard				
Android Auto	●	●	●	●
Apple CarPlay	●	●	●	●
Mobile App Support				
Text Messaging	●	●	●	●
Navigation	●	●	●	●
Touch Screen				
Gesture Control				
Heads-Up Display				●
Voice Commands	●	●	●	●
Console Control	●	●	●	●

ABOUT THE STUDY

Researchers evaluated 2017 & 2018 vehicles' infotainment systems* to measure overall demand** placed on a driver when using voice command, touch screen and other interactive technologies to make a call, send a text message, tune the radio or program navigation, all while driving.

STRENGTHS

- The home screen of the center display is easily navigable with intuitive symbols.

WEAKNESSES

- The voice command system for placing calls is constrained to specific language that is not intuitive to the driver.
- All navigation functions are available while the vehicle is in motion, which places moderate to high visual and cognitive demands on the driver.
- Using voice commands to send text messages and set navigation routes led to high visual (eyes-off-road) and cognitive (mental) demand.

* Infotainment System: Vehicle system that combines entertainment and information content

**Overall demand measured: visual (eyes-off road), cognitive (mental), and time-on-task

VEHICLE OVERVIEW: CONTROLS AND DISPLAYS



VOICE COMMANDS



STEERING WHEEL COMMANDS



INSTRUMENT CLUSTER



CENTER STACK



CENTER CONSOLE

INFOTAINMENT SYSTEM

The 2018 Audi A6 Premium MMI In-Vehicle Infotainment System offers the following features:

CALLING AND DIALING



The 2018 Audi A6 Premium MMI allows drivers to place phone calls using the voice system or center console controls. If the driver attempts phone related tasks when a device is not already paired, the driver is given direct instructions on how to pair a phone using the rotary wheel. The system allows drivers to pair a new phone or select previously paired phones while in motion. Two devices can be paired to the system at once – one for phone functions and one for audio.

Drivers can make calls via voice command and the center console. Drivers have full access to the phone book while the vehicle is in motion, but the list can be narrowed using the draw pad. A quick-scroll function can also be used to quickly navigate the contacts list, but researchers[^] noted it could be difficult to spin the rotary wheel as quickly as the system requires. Researchers[^] also noted a unique platform is utilized for dialing numbers; instead of a standard dialing keypad, numbers are organized in a circle and drivers can spin the rotary wheel or draw individual numbers using the touch pad. Once calls have been placed, another rotating menu is presented which gives access to related functions during the call (dial pad, end call, etc.).

Call functionality is available through the steering wheel as well, allowing drivers the capability to call all contacts in the directory and access the recent calls list. Interactions via the steering wheel appear on the instrument cluster display.

Voice commands are also available to facilitate phone interactions. The system uses very specific phrases, but possible phone commands are displayed when the voice command system is activated, providing the driver the exact verbiage necessary to place a call. All phone features are available via voice commands, and the system even allows drivers to customize the menu titles in order to have quick access to favorites or recent calls.

Overall, drivers experienced a high level of demand when placing calls using the center console and voice commands. While placing calls using the voice commands, drivers experienced moderate visual (eyes-off-road) demand and high cognitive (mental) demand. This in turn caused drivers to take an average of 17 seconds⁺ to place calls using voice commands. The high cognitive demand is likely due to the inflexible commands required by the system to place a call. Placing calls via the center console took drivers 20 seconds⁺ on average; however, the cognitive (mental) and visual (eyes-off-road) demand placed on drivers were high. The system's full access to the contact list while in motion, along with the difficulty of using the rotary wheel, contributed to these high cognitive and visual demands.

TEXT MESSAGING



The system allows drivers to send 10 predefined text messages, all of which are customizable, via voice commands and the center console.

Messages can be sent using the center console controls through the phone menu. The system provides access to the full inbox, which displays recent and unread messages at the top. After an individual message has been selected, the system reads the time and date, contact name, and message type prior to reading the message content. Message content is displayed on the center stack screen while the vehicle is in motion. Drivers are also able to have the message read aloud by pressing a shortcut button on the center console touch pad. An "Options" button allows driver to select from features such as delete, call, reply, forward and extract number. All 10 predefined messages are available while the vehicle is in motion, and drivers are provided with the option to type custom responses while the vehicle is in park.

Overall, drivers experienced very high demand when sending text messages using the center console and voice commands. Drivers faced very high levels of demand when sending messages using voice commands, which took

⁺ Compared to a recommended maximum of 24 seconds

[^] Researchers with expertise about how humans interact with technology evaluated the usability of the infotainment system in stationary vehicle

^{*} Infotainment System: Vehicle system that combines entertainment and information content

approximately 40 seconds⁺, on average. Researchers[^] note that this is likely due to the unintuitive interface, such as the unconventional response procedure, the limited number of response options, and the convoluted and layered interaction design. Sending texts via the center console took around 21 seconds⁺. These tasks generated high visual (eye-on-road) and cognitive (mental) demand. Researchers[^] noted that factors contributing to the high visual demand included the center stack screen, which displays a myriad of message information, and lengthy text message threads that can be scrolled through. The overall high cognitive demand of the text messaging capabilities can be attributed to the complex and numerous steps needed to complete a single task.

AUDIO ENTERTAINMENT



The steering wheel, voice commands or center console can be used to change audio entertainment sources which include FM, AM and XM radio; Bluetooth; USB; CD; SD card or auxiliary port.

The home menu shown on the center stack screen offers separate submenus for radio and media; the center console has corresponding shortcut keys that can be used to quickly change these sources, as well as six touch-sensitive buttons along the top of the touchpad corresponding to the first six radio presets.

All audio entertainment voice commands must be preceded by saying either “Media” or “Radio”, depending on the desired source. Researchers[^] noted that very specific verbiage is required for all voice interaction. However, when using voice commands, possible radio/media commands are listed on the screen. The voice command system utilizes a multi-layered menu structure, lengthening interactions when changing songs on a media device. For example, drivers must first say “Media,” followed by “Genre” for the system to display general categories, then select the associated line number for jazz. Drivers must then continue to interact with the system to select an artist, then an album from that artist, and finally, a song from that album.

Limited functionality is available via the steering wheel. It can be used to quickly change sources and navigate radio presets and a local station list. If a media device is connected as the active source, drivers are able to access songs within the currently selected category (i.e., album or artist playlist).

The audio entertainment features placed overall high demand on drivers. Using the center console took 17 seconds⁺, on average, but driver’s still experienced high levels of demand when adjusting audio functions. Researchers[^] noted the cluttered center stack display along with the ambiguity of the rotary wheel and button controls contributed to the high demand when using the center console. The inaccuracy and rigidity of the voice system required drivers to attempt commands repeatedly. Coupled with the system’s slow rate of speech, and lengthy menu structure, voice commands for audio entertainment contributed to high cognitive and visual demands for an average of 22 seconds⁺.

TURN-BY-TURN NAVIGATION SYSTEM



The 2018 Audi A6 MMI has a turn-by-turn navigation system accessible via voice commands, the steering wheel and the center console. This system placed high overall demand on drivers when completing navigation tasks.

Using voice commands, the driver can search for a specific location or a general point of interest category. Drivers are also able to navigate to previous destinations and input addresses. Similar to other voice functions in the vehicle, drivers must say “Navigation” before offering any commands related to route setting. Further command options are listed on the center stack screen. This layered menu design with multiple steps increases interaction time, and is complicated for drivers to navigate.

The center console allows the driver to utilize a search function via the draw pad or rotary wheel, navigate to previous destinations and saved addresses, as well as input new addresses or find destinations using a category menu. A submenu, accessible via a rotary wheel or button represented with four lines in the top right, gives access to additional navigation

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functions. Surrounding the touchpad and near the rotary wheel are three additional buttons access menus for traffic information, settings and can be used to begin route guidance once a destination has been set and calculate alternate routes. There are no motion restrictions, and the draw pad can be used at any point in the navigation process. Once a route has been selected, the center stack display reveals a map screen showing the next three turn-by-turn instructions.

Drivers experienced overall high levels of demand when using the MMI navigation system. It took 32 seconds⁺ for drivers to access the navigation features via voice commands and the system placed high cognitive (mental) demand on drivers. The long task time and high cognitive (mental) demand were linked to the layered menu design; making destination searches especially lengthy and complex. It took an average of 26 seconds⁺ to use the center console for the navigation system, which also placed high cognitive and visual demands on drivers. Researchers[^] noted the crowded map screen and complex categorical menu structures likely contributed to the high demand on drivers.

VEHICLE CONTROLS AND DISPLAYS

VOICE COMMANDS

The 2018 Audi A6 Premium comes equipped with a voice command system that allows drivers to access audio entertainment, call contacts, dial numbers, set navigation guidance and send predetermined text messages. The voice command system is activated by pressing the voice activation button on the right-hand side of the steering wheel labeled with an icon of a person speaking.

INSTRUMENT CLUSTER

The instrument cluster located behind the steering wheel features a 7-inch LCD display centered between two circular gauges on the right and left sides. Drivers can access features in the instrument cluster via buttons on the steering wheel. The left circular gauge houses the tachometer while the right circular gauge houses the speedometer and fuel gauge. Via the LCD display the driver can access a digital speedometer, audio entertainment, phone directory and navigation.

STEERING WHEEL CONTROLS

The steering wheel contains a symmetrical design of six buttons, with two scrolling wheels, one on each side. Buttons on the right side of the wheel control voice commands, volume and navigation guidance. The left side provides the ability to scroll through menus and options to make selections. The buttons are accurately labeled with a mixture of icons and text; however, the inner buttons can be difficult to reach for the driver. The buttons also respond to the driver and provide strong haptic feedback.

CENTER STACK

The center stack is equipped with a retractable 8-inch full-color LCD display with no touch capabilities that can be controlled by a manual rotary wheel, located in the center console. Functions displayed on the home screen menu are navigation, time, audio entertainment, car settings and connected phone features. Individual temperature gauges with shared fan speed and airflow provide access to dual climate control functions, and 11 buttons and three dials follow standard HVAC conventions.

⁺ Compared to a recommended maximum of 24 seconds

[^] Researchers with expertise about how humans interact with technology evaluated the usability of the infotainment system in stationary vehicle

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CENTER CONSOLE

The 2018 Audi A6 Premium comes equipped with a center console interface that interacts with the center stack display. A spinning rotary wheel can be used to navigate menus and make selections. The rotary wheel is surrounded by four silver buttons that have corresponding functions with the four corners of the display. There are four shortcut buttons around the rotary wheel, two on each side, which yield access to IVIS functions. A menu and back button located behind the rotary wheel can be used to navigate the menu structure. Next to the gear shift, a multifunction touchpad can be used to draw letters and numbers as well as select preset radio stations using six touch-sensitive buttons.

VEHICLE SALES SUMMARY

The 2018 Audi A6 Premium is the 196th bestselling vehicle in the United States, with 10,561 vehicles sold during 2018¹.

¹ Source: Auto sales data and statistics at goodcarbadcar.net; data updated to 1/4/2019.

+ Compared to a recommended maximum of 24 seconds

^ Researchers with expertise about how humans interact with technology evaluated the usability of the infotainment system in stationary vehicle

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